

I Claim:

1. A method of optimizing the implementation of a piezoelectric resonator-based network, comprising the following steps:

5 decomposing an original resonator in the network into a pair of series connected resonators to add an additional electrode to the network;

10 connecting the pair of resonators to a shared electrode to be mounted to a surface of the piezoelectric material;

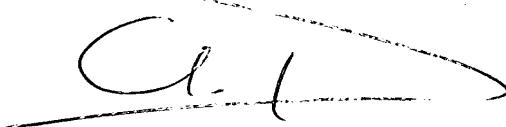
15 placing the additional electrode on a surface of the piezoelectric material opposing the surface to which the shared electrode is mounted; and

20 matching the composite characteristics of the series connected resonators with those of the original resonator to preserve the original characteristics of the network.

25 2. The method of claim 1 in which the piezoelectric resonator has first and second electrodes on opposing surfaces of the piezoelectric material, and the added electrode is placed on the same surface of the piezoelectric material as the first electrode is placed.

3. The method of claim 1 in which decomposing an original resonator comprises:

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locating a piezoelectric resonator in the network; and



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replacing the resonator with two series connected resonators ~~which~~ who are connected only to each other at the shared electrode.

4. The method of claim 1 in which matching the composite characteristics of the series connected resonators with those of the original resonator comprises:

placing two electrodes on one surface of the piezoelectric material; and

10 placing the shared electrode on the other surface of the material in overlapping relation to the two electrodes to create the pair of series connected resonators.

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5. The method of claim 4 in which the electrodes are placed to create ~~two~~ ^R series connected resonators each 15 with twice the capacitance of the original resonator.

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15. The method of claim 4 in which the electrodes are placed to create ~~two~~ ^R series connected resonators each 20 with twice the capacitance of the original resonator.

6. A piezoelectric resonator comprising:

a layer of piezoelectric material;

a pair of electrodes mounted on one surface of the piezoelectric material; and

20 a third electrode mounted on an opposing surface of the piezoelectric material,

each electrode of the pair mounted in overlapping relation to the third electrode to create two series connected resonators that are ~~connected=only=to~~ ^{The only connection is to} 25 each other at the third electrode.

sub B43 7. The piezoelectric resonator of claim 6 in which the two series connected resonators have equal capacitance.

10. *sub B47* 8. The piezoelectric resonator of claim 6 in which each electrode of the pair is for connection to other circuitry.

sub B47 9. A piezoelectric resonator-based T network comprising:

10 a pair of series connected piezoelectric resonators sharing a first electrode;

15 a shunt element connected to the first electrode and to a signal ground; and

15 a third piezoelectric resonator series connected to one of the pair of series connected resonators or to the shunt element at a second electrode,

the third resonator and the piezoelectric resonator or the third resonator and the shunt element being the only connections to the second electrode.

20 2. 10. The piezoelectric resonator-based network of claim 9 in which the shunt element comprises a piezoelectric resonator.

25 3. 11. The piezoelectric resonator-based network of claim 9 in which the third resonator is series connected to one of the pair of series connected resonators to place electrodes on opposing surfaces of the piezoelectric material for connecting the network to other circuitry.

12. The piezoelectric resonator-based network of
claim 9 in which the third resonator is series connected
to the shunt element to place signal ground on an opposing
surface of the piezoelectric material from other
electrodes that connect the network to other circuitry.

4. 13. A piezoelectric resonator-based pi network
comprising:

P₁ a first pair of resonators sharing a first
electrode for connection to other circuitry;
P₁ a second pair of resonators sharing a second
electrode for connection to other circuitry; and
P₁ a series connected pair of resonators comprising
a resonator from each of the first and second pairs and
sharing a third electrode, the series connected pair being
the only connections to the third electrode.

5. 14. The piezoelectric resonator-based network of
claim 4.13 in which the pair of series connected resonators
place electrodes on the same surface of the piezoelectric
material for connecting the network to other circuitry.

20 P₁ 15. A piezoelectric resonator-based L network
comprising:

a first resonator including a first electrode for
connection to other circuitry;
a shunt element connected to the first resonator
at the first electrode; and
a second resonator series connected to the first
resonator or to the shunt element at a second electrode,

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the second resonator and the first resonator or
the second resonator and the shunt element being the only
connections to the second electrode.

16. The piezoelectric resonator-based network of
5 claim 15 in which the second resonator is series connected
to the first resonator to place electrodes on the same
surface of the piezoelectric material for connecting the
network to other circuitry.

17. The piezoelectric resonator-based network of
10 claim 15 in which the shunt element comprises a third
piezoelectric resonator.

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